The Air Line Pilot

April, 1953

Disability Insurance

Jet Transport

Exterior Lighting Chairman Reports

Exterior Lighting (Pages 6-7)

Let's Modernize Aircraft Lighting

Air Line Pilots offer recommendations for building a

Jet Transport

ALPA's Engineering and Air Safety Department files on accident investigation, design recommendations and operating problems experienced by air line pilots, and an active study of operating problems peculiar to turbine powered aircraft have produced these recommendations.

Since very little experience relating to commercial turbine powered transports is on hand for evaluation, the recommendations contained in this article relate for the most part to short-comings in present day airliners. It is hoped that all concerned with the introduction of design and operating plans for turbine aircraft will continue to channel information and ideas to manufacturers. The ideas contained in this article have been presented to manufacturers in the hope that they will be considered **before** a jet transport is put into line flying service. ALPA believes that the material presented here is sound and that safer transport planes will result if the recommendations are followed. Since it is impossible at this stage in the development of turbine aircraft to anticipate all of the problems which will arise, it is also hoped that active liaison will be maintained between the manufacturers, the operators, and ALPA.

Vol. 22, No. 4

The Air Line Pilot

April, 1953

Published Monthly by The Air Line Pilots Association, International, Affiliated with A. F. of L. Publication offices: 55th Street and Cicero Avenue, Chicago 38, Illinois.

Clarence N. Sayen
President
Jerome E. Wood
First Vice-President
F. A. Spencer
Secretary
Lyle R. Hincks
Treasurer
Sterling W. Camden, Jr.
Executive Vice President

REGIONAL VICE PRESIDENTS

A. F. Foster ..... Region I
W. T. Babbitt ..... Region II
M. E. Swanson ..... Region III
L. R. Williams ..... Region IV
C. A. Peternell ..... Region V

Larry Cates
Legislative Representative

Advertising appearing in this magazine cannot be construed as being an endorsement by The Air Line Pilots Association or the Air Line Pilots.
Application for re-entry as Second Class Matter at Joliet, Illinois is pending.
Entered as Second Class Matter March 11, 1933, at the Post Office at Chicago, Ill., under the Act of March 3, 1879.

Copyright, 1951, by Air Line Pilots Association, International.

Annual Subscription, $2.50

W. Johnston, Editor

Stall Speeds. An analysis of data, bibliography and current thinking relating to the problem of safety of current and projected air line transports (with particular emphasis on jets) shows that stall speeds demand prime consideration. Probable rational landing distances required by jet transports indicates that for the same stalling speed they will require approximately 33 percent more landing area than propeller driven aircraft. Recent findings regarding aircraft behavior while making alignment corrections during final and critical stage of an instrument approach point up the "ballistic tendency" of aircraft; a tendency which increases with wing loading and stalling speed.

Therefore, it appears that for a given runway length the stalling speed of a turbo-jet should be less than that of a propeller driven transport. That opinion is supported by responsible air transport operations officials. While it is extremely difficult to set any hard and fast limitation on the stall speed without a detailed study of specific proposed operations, taking into account the effective runway lengths available at terminals and alternates, the weather conditions prevailing, and the approach aids available and their accuracy and reliability, it is ALPA's recommendation that the stall speeds of turbo-jet transports should be limited to:

—90 mph for a 6,000 foot landing runway at sea level at maximum landing gross weight, and

—97 mph for a 7,000 foot landing runway at sea level at maximum landing gross weight.

It is believed that a modern transport can be produced which will have some control through the stall and good control at slightly above the stall speed. Good control during final approach and near the point of contact at as low a speed as is considered safe will assist an airplane to safely operate into small airports, and will provide controlled slow speed contact with land or water in the event of an unscheduled off airport landing.

To achieve a necessary increase in the safety of operations during approaches and landings, the ALPA, the manufacturers, the operators, and regulatory agencies of the Government must give due consideration to the necessity for a more realistic appraisal of the stall speed and runway length relationship. Continuing and active participation in the work of

the CAA-CAB Performance Committee offers the most practical course of action. In studying this relationship (stall speeds and runway length) ALPA has become aware of the opinions of several highly placed engineering and operations officials of four major U.S. airlines:

In his **"Notes on Airport Safety,"** Jerome Lederer quotes a Vice President of Engineering of one airline as follows: " . . . I am particularly interested in Mr. Van Every's conclusion, stated in American Aviation . . . that 15,000 foot runways will be needed for jet transport operations by 1960. It appears to be based on the assumption that a jet transport will be designed and then the runway made to accommodate it. Obviously, if the runway length is specified as a basic condition, the jet transport, with some possible sacrifice, can be made to meet its limitations—which appears to be a much more practical approach.

"Mr. Van Every's analysis, however, does emphasize the necessity of doing everything possible to keep jet transport stalling speeds as low as possible consistent with the high performance requirements. It is hoped that to this can be added improved flaps. I am wondering if you have been entertaining any thoughts of applying the possibilities of boundary layer control powered from compressor reserve capacity at low altitude as a possible assistance to reduced approach or landing stalling speeds . . .

"As to Mr. Van Every's general conclusions that airport runway lengths and stalling speeds must inevitably increase, I would say that, as a basic requirement for jet transport operation, this must not be allowed to happen."

The tentative requirements for a jet transport of another major airline contain the following:

"Speed, Stall. The CAR stall speed of an airplane at maximum landing weight and in the landing configuration shall not exceed 100 mph. I.A.S."

"Field Length, Landing. At sea level and maximum landing weight the CAR landing distance shall not exceed 6,000 feet."

The Vice President of Engineering of a third major U.S. airline was quoted as thinking that "Stall speeds have passed the acceptable figure."

When considering a prospective jet transport, the means for ground decelerating appears to be tied closely to runway length also. Due to the increased speeds and limited runway lengths, a means must be found for stopping the jet transport faster. The fact that no airliner equipped with a reverse pitch propeller has ever had an "overshoot" accident proves the desirability of a means other than wheel braking for stopping aircraft. The means should be contained and operated from the airplane in a similar manner as reverse thrust applied to piston powered engines. For turbo-prop operations, reversal of the blades suggests itself, if it would have no adverse effect on the power plant.

Associated Factors. Conditions which adversely affect performance must be considered when planning the jet transport. Some factors are the effects of temperature, humidity, pilot technique, service abuse, and power loss on the aircraft's ability to perform. While the above factors are being studied for regulation purposes, it still behooves the manufacturers to provide information on these points to their customers. With this knowledge, the operators can determine which aircraft fits its particular routes.

Speed Reduction. With the greatly increased cruise speeds anticipated from turbine powered transports and the problem of coping with turbulence, a means of rapidly reducing air speed is essential to insure against structural damage and passenger discomfort. The device should be capable of operation at a speed sufficiently above the critical mach number to insure that control can be regained if the critical mach number should be inadvertently exceeded. The device should allow the pilot to establish an emergency descent with flaps and landing gear either retracted or extended without affecting control of the airplane. It should be relatively quiet and free of vibration to minimize passenger alarm.

With the airplane in the configuration for maximum rate of descent it should be possible to change to a configuration required for a pull out or for manuevering without undue control difficulties. The device should allow descent from a maximum cruise altitude to a serviceable level (20,000) feet in about 2 minutes (in the event of loss of pressurization).

Controls. For simplicity, a non-boost control systems is desirable..

Next Month

Reports on:

IFALPA Chicago Conference
ALPA Air Safety Forum

Individually operated wipers are needed.

However, with a boost system, the control response and feel should be similar to that of today's large transports. For obvious reasons, the airplane should be capable of meeting maneuvering and landing requirements without the boost system functioning. Failure of any two engines of a four engine aircraft or one of a twin engine aircraft should not make the control boost inoperative. Pending further refinement of autopilots, enough dehedral and aerodynamic stability should be built into the aircraft to ease the burden of constant attention to the controls to maintain proper flying attitude.

Ventilation and Pressurization. To reduce fatigue and provide a well heated and ventilated crew compartment, the compartment should receive an independent supply of fresh air that can be controlled by the flight crew.

The ventilating system of pressurized aircraft should be designed to admit **only** pure air to the flight crew compartment, and in case of failure of the component the last part of the airplane to be deprived of fresh air should be the flight station.

The amount of fresh air delivered to the pilot compartment should be not less than twenty cubic feet per occupant at sea level or its equivalent weight at altitude.

Cockpit air conditioning should eliminate direct drafts, maintain a reasonable comfort level, and provide a level of humidity high enough to promote good health at altitude.

Air intakes should be located so that exhaust gases cannot enter the ventilating system in flight.

The maximum allowable accumulation of carbon monoxide in the pilot compartment should be .001 percent.

Incoming air should be filtered to prevent the entry of oil vapor. No lubricating oil containing elements of toxic nature should be used where it might escape into the pressurization-ventilation system.

The ventilation system should assist in the removal of smoke in case of fire.

Indicators should measure the amount of ventilation provided during flight.

Passenger cabin air, when recirculated, should be filtered and reclaimed to the extent of removing dust, smoke particles, excess carbon monoxide, excess carbon dioxide, and odor.

The pressurization system should maintain a cabin altitude of 5,000 feet or lower at the highest altitude commonly used in flight.

The ground check for air flow, duct and cabin air leakage and similar checks should be done without the necessity of connecting external sources of air pressure.

Fuel System. Many fatalities from fuel system fires following an otherwise survivable accident are evidenced in aircraft accident reports. CAA Development Section crash resistent fuel tank designs should be considered.

A means of fueling the airplane that eliminates the need for service stands and service personnel abusing wing leading edges and wing surfaces is needed. Underwing fueling could be the answer.

It is important that no fuel be stored in the fuselage. Fuel should be stored as far outboard of the engines as possible. The use of wing tip tanks is suggested even though it might mean a slight sacrifice in speed.

An accurate and reliable fuel quantity gauge is needed. Fuel consumption will be an even more important element in turbine flight than it is today. Present fuel gauges, though improved, are not up to the desired level of accuracy and reliability. A means of visually checking the fuel capacity while the airplane is on the ground is recommended. The visual check would be a balance against the indicator.

An adequate fuel dumping mechanism is desired. Pilots are now reluctant to dump fuel due to the fire hazard created by the malfunctioning of dumping systems now installed. Valves occasionally fail to close; valves sometimes open without the chute lowering.

Icing Conditions. Considerable headway has been made during recent years in the study of icing problems. The knowledge should be used to find a reliable means of de-icing the windshield. Consideration should be given to the operating experiences with Nesa glass windshields.

With the two-pane, hot air windshields used on some transports a dangerous condition exists. Recently a transport had a fire warning light come on at 21,000 feet. To fight the fire it was necessary to depressurize. The emergency descent (from cold air to warm) caused severe windshield fogging, with no available means of defogging. The episode ended happily, since it was a false alarm, but the windshield fogging would

(*Cont. on Page* 14)

Whiting Evans, Aviation Insurance Specialist, comments on

Disability Insurance

A practicing insurance underwriter points out some advantages and evils allied with purchasing disability insurance

Every airline pilot has two problems over which he has little or no control: Sickness and accidents which disable him to the extent that he can not work at his profession and the possibility of dying prematurely before his children are educated and able to care for themselves and the dependency of his wife.

It has been my observation that the latter problem has been cared for by most pilots in a most reasonable fashion. They have either purchased sufficient Life Insurance or realize the problem and are in the process of purchasing it. The first problem being sick or hurt and unable to work, is much more difficult to solve. I quote S. S. Huebner, Ph. D., Sc. D., Professor of Insurance and Commerce at the University of Pennsylvania. who says, "A Life Insurance program, as family protection, remains incomplete, unless there is incorporated somehow, adequate provision for disability income protection. Such a coverage goes hand in hand with Life Insurance coverage. The two are teammates . . . "

A disability policy purchased by a pilot should contain the following provisions:

—It must be Non-Cancellable.

—It must be Guaranteed Renewable . . . a policy which may omit the cancellation clause but leaves the option of renewal with the Company, is similar to a cancellable policy.

—It must be Non-Assessable . . . a policy on which assessments may be levied could increase the premium to such an extent that the policy would become unprofitable.

—Every disease should be covered without exceptions.

—Full benefits should be paid irrespective of whether or not the disability causes confinement. If price is paramount, it is safe to buy a Half Benefit contract for non-confining sickness but full benefits for accidents, provided the non-confining sickness provision runs for as long a period as the confining did.

—Benefits should commence at least after the first week of disability. The insurance agent who advises one month or three months' elimination is, in my opinion, giving bad advice. Many serious ailments may never continue over a longer period than one month, but recur so often that any sort of long elimination period would cause a serious loss. There are various periodicals circulated amongst professional men, Doctors, Dentists, Pilots, Architects, Engineers, Lawyers, which confirm my above stated facts.

—There should be no geographic limitations in the pilot's policy. You will find that many disability policies contain a provision where sickness is concerned, stating that the company will not pay for illness contracted outside the United States, Canada or its possessions. You can contact a disability in Paris, France or Berlin, Germany, as easily as you can in New York City.

Need for Protection. An airline pilot, perhaps more than applies to any other vocational category, *must* be healthy. Therefore, it follows that health and well-being are the most important assets that a pilot has. Not to set aside a very small fraction of a pilot's income to guard against even the possibility of no longer being able to work, can justifiably be termed neglect. With Life insuraance, the problem presented by death can be solved. When a man can no longer work to produce money, where is that most necessary commodity to come from? Savings all gone; life insurance cash reserves borrowed against to the hilt; deeply in debt? What happens next? There is no need to further torture the imagination.

Complete Coverage. Most pilots *do* have some form of disability income protection. Usually, however, income protection against *accidental* injury is the type held. The gamble that disability will be caused by injury is a hazardous one. According to a recent U. S. Governernment survey, it was found that there are 345.1 disabilities from *all* causes per thousand population. Of these only 499.9 were attributable to accidents; only 14%! The other 86% were due, of course, to sickness. The experience gained in over fifty-two years of a well-known insurance company writing health and accident insurance shows that seventy per cent of their claims were due to sickness and thirty per cent to accidents. In other words, to insure against accidents only is like taking out a fire insurance policy to cover only one-third of a house—the kitchen, and dining room and pantry—leaving the rest of the house unprotected. By all means, any policy protecting a pilot from the hazard of being disabled, should contain no exceptions whatsoever. ALL sicknesses, mental as well as physical, should be covered. ALL injuries, regardless of how they were caused, and whether contributorily negligent or not, should be covered.

"Total Disability." How is "Disability" defined? What constitutes "total disability"? Total disability as defined in almost all policies written by companies of good reputation, is the "inabiity of the insured to perform any and all of

(*Cont. on Page* 10)

Shop Talk on Aircra

A line pilot, First Officer Raymond L. Weigle, AA, asks some questions on the adequacy of present day aircraft exterior lighting

It has become more obvious that the current Civil Air Regulation applicable to the lighting of transport aircraft during the hours of darkness (CAR Amendment 4b-1) is not only inadequate for the faster commercial planes and increased traffic of today, but has some downright dangerous features which should be remedied immediately.

There are, in my opinion, two main faults with the regulation: (1) The lights are not bright enough. (2) The system of lighting is confusing.

Brighter Lights. The modern airliner is now in the 300 m.p.h. class and getting faster all the time. A DC-6 and a Constellation have a head-on closing speed of over 600 m.p.h.—10 miles a minute!

Often in VFR conditions, when the absolute visibility is three miles or more, haze or smoke conditions can reduce the *effective* visibility of present aircraft position lights to two miles or less. When the visibility is reported as three miles, it is perfectly true that one should be able to see airport beacons, approach lights, and other bright objects three miles away; but it does not necessarily follow that a dim wing light of another plane can be seen from the same distance. In effect, this means that when we are flying VFR with a reported visibility of three miles, we are really flying with an *effective* visibility of perhaps one or two miles in respect to other aircraft; and it is the other planes with which we are primarily concerned when flying VFR.

Using the example of the Constellation and DC-6 approaching each other—they will cover that distance of two miles in 12 seconds! This obviously doesn't give the pilots a whole lot of time to evaluate the situation and take evasive action—even if (and this is a big *if*) one of the pilots sees the other plane at the very instant it becomes visible. Assuming the effective visibility of the aircraft lights is reduced to one mile, the interception time becomes only six seconds!

Let us assume for the sake of illustration that our DC-6 and Constellation pilots have 12 seconds to evaluate the situation and change course to avoid a collision. At first glance it would appear that this should be adequate time. Possibly it would be, but there are certain influencing factors.

For one thing, it is not often a person will notice a dim light the instant it becomes visible. The pilot cannot be looking everywhere at the same time; so that, unlike a distant light on the ground as seen by the control tower operators (who know the light is there), an aircraft light must be much brighter before it will attract the attention of the pilot. Secondly, modern airliners are equipped with a considerable amount of radio and navigational equipment. Good stuff to have. But it will not operate itself; one or both of the pilots are often busy adjusting the dials, checking frequencies, or setting bearings. The pilot that does it will have his eyes in the cockpit for five to ten seconds, at least. There are also complicated engine operating instructions to comply with, flight plans to take care of. Drop a pencil on the floor and reach down to pick it up in the dark. Time yourself. If you find it within ten seconds, you are really in luck.

Of course, it is true, there are two pilots and they both do not usually have their attentions diverted at the same time (although it does happen), and one or the other should see another plane in time to avoid hitting it. As a matter of fact, there are four pilots in the two planes, any one of which could take the necessary action. Neverthless, the hazard exists, and, with ever increasing air traffic and speeds, brighter lighting is a must.

In an effort to make their aircraft more visible at night, there have been some notable experiments lately by a few of the major airlines. A high-powered, revolving amber beacon on top of the fuselage or vertical stabilizer, for instance, is being tested by one or two lines, while another has installed bright, red nose lights. Although these ideas are definitely a step in the right direction, they are inadequate in that they do not contribute to the next factor we will discuss and, in fact, even tend, by their very brightness, to obscure the flashing position lights, thus leaving just as much doubt as ever as to the plane's true course and distance.

No, bright lights alone will not solve the problem. This brings us to the second factor.

(*Cont. on Page* 13)

Exterior Lighting

ALPA's Committee Chairman on Exterior Lighting, Bob Stone, UAL, replies and explains the Association's plans and progress on the problem

First Officer Raymond L. Weigle of American Airline has offered recommendations to ALPA on the subject of Aircraft Exterior Lighting (Facing Page) which shows his deep interest in the subject and shows that he has given the subject some serious thought. The Engineering and Air Safety Department of ALPA has asked me to comment on Mr. Weigle's paper since I have been representing ALPA on Aircraft Exterior Lighting matters for the past three and a half years.

Mr. Weigle opens his paper with a good statement of the need for adequate lighting. His treatment is quite similar to that which appeared in the September, 1950 issue of "The Air Line Pilot." Briefly the problem can be summed up by saying that there is more and more traffic flying at faster and faster speeds. Complicating the problem is the fact that we have marginal VFR operations and that pilots are busy enough in their cockpits that they may not see another airplane's lights at the first instant that they come into view.

Time. Any pilot will grasp the problem if he just realizes that when two 300 mph airplanes meet head-on, at a bare three mile VFR range, they have only 18 seconds to avoid a collision. There is no argument that we have a problem so let's look at some of the possible solutions.

Studying this problem has been a committee of the CAA, CAB, ATA, ALPA, Air Force, Navy, Bureau of Standards and various lighting manufacturers. Meetings are held, actual flight tests are conducted, and regulations are suggested. The work progresses slowly because there is surprisingly little factual information available on Exterior Lighting. Aso retarding progress is a lack of funds and some intra-agency prejudices. However, some progress has been made.

The first suggestion Mr. Weigle makes is that position lights should be brighter. The committee is in complete agreement with him on this point. Here's the problem though. The present position lights are 24 candlepower and are 1¼ inch in diameter. The bulb manufacturers say that it is impossible to put anymore candlepower in a 1¼ inch bulb due to heat dissipation problems. Just stepping up to 32 candlepower results in blackening the inside surface of the bulb, which, of course, cuts down the light transmission drastically. They have a ready answer for us; let the bulbs be 1½ inch in diameter and it is possible to build a bulb four times as bright as the present position lights. Now we run into real trouble! The present fixtures on the airplanes cannot accommodate the new 1½ inch bulb. New fixtures are required, and in some cases this means extensive modification of wing tips. The CAB is reluctant to write a regulation that is "retroactive." In other words, the CAB feels it cannot require an airline to change an airplane after it has once been certified. The airlines themselves are not enthusiastic about expending the money necessary to adopt the 1½ inch bulb. That's where we are now; we know that we should go to 1½ inch bulbs but how do we get them?

Three Purposes. The committee has, after much arguing, agreed that aircraft exterior lights must serve three purposes and serve those purposes in a specific order. First the light (s) must make the aircraft conspicuous. Second the light (s) must signify what the aircraft is doing. Third the light(s) must identify what class of aircraft is in view.

This order is safe and proper. If you are flying along some night the first thing you want to be aware of is that you are not alone; something must be conspicuous to attract your attention and say, "Hey Mac, there's something out in the sky ahead of you." Once you are aware that something is out there, you want to be able to determine what it is doing. Is it coming at you, going away, or crossing your course? That's the second function of exterior lights. Lastly, after you have seen the object and determined what it is doing, you may be interested to learn that it is an airplane, or a helicopter, or a blimb.

The whole idea behind this order of light functions is that it all leads to executing the famous maneuver known as "getting the hell out of here." If you see a light that is conspicuous, but you are unable to determine what it is doing, you can still avoid it by doing a 180 degree turn if nothing

(Cont. on Page 12Q

Camera

Attending the American Airlines Air Safety Committee Meeting at ALPA Headquarters on March 17 were (Left to right, clockwise) Walter F. Wilbur, 19; Harry C. Job, 22; Chick Andrews, 6; L. O. Meredith, 39; G. R. Russom, 92; J. W. Stowell, 35; J. H. Durham, 22; T. G. Linnert, ALPA Headquarters; O. M. Garin, 91; J. W. Knight, 50; C. Daudt, 22; Vernon H. Brown, 62.

Attending the Delta/C & S Seniority Meeting on March 20 at ALPA were (left to right, clockwise): H. Averett, 44; J. H. Longino, 44; J. C. Kelly, 66; J. R. Reeves, 66.

Attending the UAL Negotiating Committee Meeting held on March 26 at Home Office were (l to r, clockwise) E. N. McKittrick, 52; R. F. Shirley, 57; R. L. Tuxbury, Master Chairman, 52; Ralph Catlin, 12; Chas. R. Barnes, 57.

News

IFALPA Meeting Set For April

Representatives of the International Federation of Air Line Pilots Associations will convene in Chicago, April 6-10. The pilot associations of Australia, New Zealand, Great Britain, Finland, Eire, France, Italy, Canada, Philippines, Africa, and Belgium will send representatives to the five-day meeting.

ALPA President, Clarence N. Sayen, also President of the International Federation announced that the agenda would include resolutions and reports on authority of the pilot-in-command; phonetic alphabet; controlled flight; power sources for gyroscopic blind-flying instruments; ICAO meetings attended by IFALPA members; IFALPA study groups on airworthiness, South East Asia, and search and rescue; quadrantal separation for VFR flights; accredited representatives at accident investigations; airborne radar; altimeter settings; stall speeds; reverse thrust; three-engine ferry flights; aircraft passenger carrying capacity.

First Annual Air Safety Forum

ALPA's first annual Air Safety Forum opened April 1, scheduled for a three-day meeting. The Forum, established by action of the Association's 12th Convention, will serve as a yearly conclave at which airline pilot safety specialists and Chairmen of the ALPA's special air safety committees will meet to resolve air safety problems and review the status of the Association's safety projects.

Among the special projects discussed were: "Rational Performance Standards, Airport Noise Abatement, Aircraft Exterior Lighting, Cockpit Standardization, Emergency Evacuation, Fire Hazards, Approach Lighting, Cockpit Procedures, Inadvertent Propeller Reversing, Physical Standards, and the status of radar in air line operations.

Disability Insurance

(*Cont. from Page 5*)

the duties of his regular occupation." It is further provided in the contract, that no indemnities shall be payable during any period while the insured *is* gainfully employed in any occupation for which he is reasonably fitted. Whether this latter portion is stated in the contract or not, the companies hold to this interpretation. Companies of reputation pay promptly and fairly. A pilot who is disabled will be paid his disability benefits until he is able to fly again. That is his profession, but if he finds that he is not able to fly and does take up another occupation for which he is reasonably fitted, the companies will not, naturally, continue his disability benefits after he is employed in an occupation for which he is resonably fitted.

"Non-Cancellable." One question, of greater importance than any other, should be asked of the agent from whom a pilot buys his disability insurance. It is this: "Does the Company give me the right to *own* and *control* my policy until I am sixty-five years of age?" Before buying any sickness and accident policy, be sure that it may never be cancelled by the company or that there is no small print or cleverly worded phrase therein which gives the company the right to refuse to accept a renewal premium when it becomes due. If the company can cancel or refuse to accept your renewal premium, you can be very sure that it will do so when you *really* need the protection you *thought* you had bought. More important to the insured's welfare than any attractive compilation of benefits, are the actual terms of the policy. It is the contract itself which should be examined with great care.

Disability Policies. The Chief of the Policy Bureau of one of the strictest Insurance Departments in the United States, the man who knows the terms of all policies in that state and one who surely does not care from whom a policy is bought, is directly quoted as follows: "With regard to the conditions of termination of accident and health policies, there are three general types. The most common form of policy contains Standard Provision 16, permitting the company to cancel at any time regardless of cause. There are two types of non-cancellable policy contracts, one of which is renewable at the option of the company and the other renewable at the option of the insured. The former type of non-cancellable policy cannot be cancelled during any period for which a premium has been accepted by the company. However, the company can always refuse to renew by refusing to accept a renewal premium. The type of policy which is not only non-cancellable but also renewable at the option of the insured is called 'guaranteed renewable'. This means that until an age is reached as specified in the policy the company must accept renewal premiums regardless of the state of health of the insured. You will note from the above that it is definitely to the advantage of the insured to have a guaranteed renewable, non-cancellable policy."

Cancellable Policies. Now, it may be asked, "Why should an insurance company cancel or refuse to renew an Accident and Health Policy?". Cancellable companies operate on what is called a Commercial Basis. They accept standard risks. These cancellable companies find it necessary to review risks periodically at the time of renewal. They sometimes find it necessary to modify or terminate the coverage on a person because he has become a substandard risk. Such modification may take the form of exclusion of further coverage of a particular part of the body or a particular disease.

Of course, you understand that when a policy is non-cancellable and guaranteed renewable, it can never be modified in any way and it can not be taken from you until you are 65 years old. The difference between owning your protection and renting it at the option of the company, should be obvious. The man who has become seriously ill or seriously hurt and has had his policy cancelled or modified can tell you how he feels better than I can. Under the same circumstances, the man with the non-cancellable guaranteed renewable policy knows that his policy can not be touched by the company and he knows that he is protected in the future. Don't forget this: Insurance is purchased not only for the monetary value when money is needed but also for peace of mind.

Limits of Monthly Indemnity. The limit of indemnity payable for disability varies in different com-

panies. One hundred and twenty-five dollars per week (*for accidents only*) is the limit with one company for pilots while the limit in another company writing non-cancellable, guaranteed renewable *health* and *accident* insurance is three hundred and sixty dollars per month. All this type of income is, of course, *non-taxable* income and increases the purchasing power of the dollars represented in claim payments by at least twenty-five per cent. Should a pilot wish for more indemnity for disability, he should purchase several policies with different companies. One of the country's great authorities has stated that two years' sickness indemnity on a non-cancellable guaranteed renewable contract is sufficient. Ninety-nine and twenty-six percent of all people are either dead or back to work within two years.

Guarantee Against Recurrences. Perhaps the most important clause to look for in a disability contract is the "Recurrent Disabilities" clause. This part guarantees that if the insured resumes his regular occupation for a period of six months or more following a period of disability, any subsequent disability of a similar nature starts a new period of benefits. It also provides that if the insured suffers a relapse from the same cause or causes *within* six months, such a relapse would be deemed a continuation of the proceeding disability and the company's liability for the entire period—including the preceding disability or disabilities—would be subject to the limits as stated in the policy. For example, if a pilot had a policy which had an elimination period for sickness of seven days and an indemnity limit for sickness of one hundred and four weeks and if he were disabled because of amoebic dysentery for six months and then he resumed his flying duties for six months only to again have a similar attack, he would be entitled to a brand new period of one hundred and four weeks of sickness benefits. If he went back to work, on the other hand, for five months following his first attack and had a similar sickness, he would then be entitled to seventy-eight more weeks on *that* claim. *But*, there would then be no *elimination period* of seven days on the *second attack*. If the disease is entirely different, you would not be required to return to your regular occupation for six months to start a new period of disability because, naturally, it is not a continuation of the old disability. Without this clause (they will be found only in policies, to the best of my knowledge, which are non-cancellable and guaranteed renewable), payment for recurrences of a similar disability need never be expected. This is because the policy provides for payment of benefits for "one period of continuous, total disability." When a man goes back to work for even one day, his disability is no longer continuous.

"Non-Aggregate." To be well insured, a pilot should also seek a disability contract which is "non-aggregate." By way of contrast, an "aggregate" policy with a sickness provision for two years of benefits on one continuous sickness, would limit the total time to two years of benefits for one or more periods of disability. Thus, if a pilot were to be sick for five months and then recover, even though his premium would remain the same, he would have only nineteen more months coming to him. In a contract which is non-aggregate, there is obviously no limit to the number of claims.

Non-Prorating. "To be well insur-tract should also be "non-prorating." One would have to be clairvoyant to be able to tell the future, but one seldom is. What the future portends is largely in the "laps of the gods." The *non-prorating* clause reads as follows: "No reduction of any kind can be made in any indemnity herein provided by reason of change in the occupation of the insured or by reason of his doing an act or thing pertaining to any other occupation." On the other hand, a prorating clause states that if the insured changes his occupation to one classified by the company as more hazardous than that stated in the policy, indemnities would be reduced on a pro-rata basis in proportion to the extra hazard involved.

Waiver of Premium and Grace Period. By all means a pilot's health and accident policy should contain a "Waiver of premium" provision. When a man is disabled and receiving indemnity is *not* the time for him to have to use a part of that money to continue his policy in force. That's when he needs his money the most. All of the "better" policies contain a clause which guarantees waiver of premium during a period of total disability provided the insured is totally disabled at least four months immediately prior to the date the premium becomes due. Thus, the insured *can not* be left unprotected even after the policy no longer pays benefits past the indemnity limit. If another illness struck, the policy would again pay off. It is also to the advantage of the insured to have a policy which guaranteed a period of grace, usually one month, in order to pay the succeeding premium.

Benefits Regardless of Confinement. It is generally well to beware of a policy, some of which are widely advertised, which pretend to promise life time disability payments. You will find that most of these policies require that the insured be totally disabled and continuously confined within the house. It is pretty hard to imagine an illness which would never allow you to go out of doors. How many disabilities are confining for long periods of time? Scarcely any—percentage-wise. Thus, when a man goes out of doors his policy is cancelled or the company refuses to renew it. Benefits, of course, should be paid regardless of confinement. Heart trouble, tuberculosis, arthritis and many other severe disabling sicknesses are not necessarily confining. And yet, if total disability continues, benefits are needed just as badly.

Good Disability Contracts. The benefits available for pilots in non-cancellable, guaranteed renewable contracts are seldom sold in "package" form. Generally, each pilot wants slightly different coverage depending on his needs and income. Two years is the maximum time procurable for a pilot for one continuous sickness. Anything up to lifetime benefits are sold for accidental injuries. Shorter "limits of indemnity" can be bought and cost correspondingly less.

Benefits at Any Time Selected. It is possible to buy a policy which provides benefits from either the first day, 4th, 8th, 15th or 31st day. Inasmuch as a pilot's income is more or less guaranteed by his employer for at least one month, many buy policies which eliminate

the first month. Of course, the insured stands a better chance of getting his premium dollar back—plus more money—the nearer to first day coverage he buys. Eighth day on sickness and first day on accidents, is usually the most practical.

Optional Benefits. These benefits are sold with these policies which provide *additional* non-taxable income of up to $15 per day if the insured is hospitalized, payable from the *first* day up to ninety days. Miscellaneous hospital charges up to $250; special nursing care in homes or hospital; surgical benefits up to $400 according to schedule; all or part of these additions may be incorporated in a non-cancellable contract. Of particular interest to pilots is supplementary accident benefits. Any amount up to $2,500 may be bought which reimburses the insured for each and every expense he might incur as a result of any kind of an injury, diabling or otherwise.

Large Sum Settlements. Policies which include lump sum payments for amputations, loss of life, eyesight, et cetera *with* payments for loss of time, usually provide that if the insured sustains such a loss and payment is made pursuant to Part "X," all insurance hereunder except as in respect to such loss, shall immediately cease, and the certificate must be surrendered to the company. Far better is it to have one contract paying for loss of time due to sickness or injury and another separate policy for accidental loss of life and specified sums payable for amputations and other losses. This latter contract is guaranteed renewable for *life*, and all indemnities are then payble in *addition* to benefits received for loss of time.

In conclusion, first ascertain that you own your policy. In other words, see that it is noncancellable and guaranteed renewable. Purchase your disability insurance as carefully as you would your life insurance protection.

Remember, that in many instances you are going to require many more services from the agent who sells you your disability protection than you are going to require from your life insurance man. You are going to be sick or hurt many times. You are going to die but once.

Air Line Pilots Association Federal Credit Union Financial and Statistical Report January 31, 1953

BALANCE SHEET

Assets

	February, 1953
Loans (562)	$302,748.19
Cash	137,221.04
U. S. Bonds	298,185.17
Furniture & Fixtures	2,880.84
Prepaid Expense & Misc.	2,196.80
Total	$743,232.04

Liabilities

Shares	$724,665.14
Reserve for Bad Loans	13,052.83
Undivided Profits	2,681.04
Profit	2,635.81
Accounts Payable	197.22
Total	$743,232.04

STATEMENT OF INCOME & EXPENSE

Income

	February, 1953
Interest on Loans	$ 2,940.28
Investment Income	457.96
Total	$ 3,398.24

Expenses

Salaries	$ 1,074.22
Office Expense	67.24
Educational Exp.	
Loan Insurance	218.47
Depreciation	62.72
Misc.	12.53
Total	$ 1,435.18
Net Profit	$ 1,963.06

Statistical Information

	February, 1953
Number of Members	2,229
Number of Potential Members	10,898
Loans made since Organization (Number)	2,128
Loans made since Organization (Amount)	$1,428,225.02

Stone

(*Cont. from Page 7*)

else will work. If you are able to determine what the lighted object is doing you can then take less drastic evasive action than the 180. Identifying the object is relatively unimportant.

Rotating Beacon. Mr. Weigle favors a high intensity rotating beacon on the vertical fin to make airplanes conspicuous. He's absolutely right that this is the best way to accomplish the first step. The committee has flight tested many types of lights and to date this is the only satisfactory answer we have found. The vertical fin is the one part of the airplane most readily seen from any collision course. Other portions of the airplane structure are blinded by wings, fuselage, etc., but the top of the fin is usually observable. Another, and very important factor, which mandates the beacon being located on top of the fin is the elimination of halation around the cokpit. Halation is the fancy name the scientific members of the committee give to the reflected glow of light that pilots experience when flying through smoke, fog, clouds, etc.

We have located high intensity lights on various parts of the airplane and have found that the top of the fin is the only position which eliminates halation. If the light is located in the nose or immediately above the cockpit the halation is very severe. To the pilots who currently are flying airplanes with nose lights let me say that you don't know what you're missing until you remove the light from the nose and place it on top of the fin. The same applies to those pilots who have a light on top of the fuselage just above the cockpit.

Other locations along the fuselage were tried but none were as good as on top of the fin. I couldn't believe it until I did it myself, that you can fly in a solid overcast with the fin light on and not be bothered at all by halation. This is very desirable. One of the greatest hazards we encounter is when we descend out of an overcast and break out only 500 feet above another airplane which is legally flying VFR. At that point the descending airplane should be conspicuously lighted which means the rotating beacon be on in the overcast. If the beacon is located so that it causes halation the pilot will turn it off in the overcast and not be lighted when he breaks out.

The color of the rotating beacon is one point where the committee differs with Mr. Weigle. He prefers an amber beacon but the committee prefers a red beacon. The reason the committee objects to amber is that an amber light does not maintain its color definition under varying conditions of lithometers. (That's another word the scientists taught the committee.) In plain English it means that under varying conditions of smoke, haze, fog, etc., an amber light may appear amber, or red, or white. This was noted during some tests of tail light assemblies.

The British have objected through the International Civil Aviation Organization that the tail light assembly used by United States airplanes is undesirable since it displays a red light alternating with a white light. The British say that if you have a red light on the left wing tip, you

should not have a red light in the tail. To meet this objection we flight tested various tail light combinations and it was during these tests that we learned of the inability of an amber light to maintain its color under varying conditions.

The committee considered all possible colors for the rotating bea-

Attend Your Council Meetings

con. The range of colors is remarkably limited. White, red, green, amber, and blue are the only colors we could find. Any other colors were merely variations of these five. We rejected white because it blends in with city lights too easily. We rejected blue because a blue lens cuts down the power of the bulb too much. We rejected amber because of its lack of good color definition. That left us with red and green. We then became psychologists and decided that red is well associated as a danger signal and the beacon should therefore be red.

Power. Now as to the candlepower of exterior lights: It has already been mentioned that position lights four times as bright as our present ones are available if the CAB would require the airlines to make the necessary modification. Mr. Weigle suggested increasing the brightness of position lights threefold so we are in pretty good agreement on this point. However, the committee differs with Mr. Weigle on the brightness of the rotating beacon on top of the vertical fin. He suggested that the beacon intensity be "somewhat lower than the wing and tail running lights." The committee has unanimously agreed that the beacon must be much brighter than the running lights in order to make the airplane conspicuous at long range (the first function of exterior lights); the running lights should be of lesser intensity, but brighter than the present 20 candlepower lights, for determination of course and altitude at closer range (the second function of exterior lights.)

The brightness of a light is inversley proportional to the square of the distance to the light. To see a light twice as far away requires four times the brightness. Beacon lights will have 25,000 candlepower squeezed into a narrow beam; as the beacon revolves the narrow beam will register on your eye as a bright flash. The flash must really be bright in order to give early warning that there is something in the sky other than your own airplane. One airline has a beacon installed that has been observed at 94 miles in clear air. On one test the committee made we could clearly see a similar beacon at 30 miles range while the Weather Bureau was reporting only 12 miles visibility.

Mr. Weigle further suggests that when the high intensity rotating beacon is installed that we should discontinue flashing the position lights and thereby remove the red tail light and the present white fuselage lights. This suggestion was recently incorporated in CAB Draft Release 52-27. It is quite possible that this may be the correct solution to the problem but the committee has not flight tested such a configuration of lights as yet.

It may be that with a bright beacon to fulfill the first requirement (conspicuity to attract attention), then the position lights should be steady to fulfill the second requirement (determination of course and attitude of the other airplane). At this time I am neutral on the question because we have not flight tested the two systems to compare their merits. We must do such tests. We should have an airplane equipped with a good beacon fly over a city and out in the country with its position lights flashing and then with its position lights steady. One of the other system will better serve the

Schedule With Safety

purpose of determining course and attitude, but until such actual flight tests are made, we are just talking. One thing the committee has learned for sure; what sounds good or bad around a table in a meeting is not always the same answer you get when you conduct actual flight tests in the sky. We've come up with some systems that sounded great in the meeting but when we flew them we found they were terrible.

The status now is that we need rotating beacons of really high intensity on the vertical fin of all transport airplanes; we need the 1½ inch bulbs in the position lights; and then we need further testing to determine if the position light flasher should be removed.

We sincerely appreciate Mr. Weigle's interest in this subject and hope that more and more pilots will become interested in the subject. After all it is the pilots who are exposed to the hazard of mid-air collision due to the poor lights. No other group is more vitally concerned with this problem. Pilots, individually and through their committees, should actively work on their companies, congressmen, CAA, CAB, and public contacts to force early mandatory regulation for improved lighting. The rotating beacon and the brighter position lights are concrete answers that could be installed immediately if we could get the ball rolling.

Weigle

(*Cont. from Page 6*)

Eliminate Confusion. It is not enough to know that another aircraft exists. The important thing is recognizing *instantly* the course, distance, and attitude of the other plane. Only by knowing these things can a pilot immediately determine whether a collision is imminent and take the most effective course of action to avoid it.

The original plan behind our lighting regulations was good. That is, the idea of a red light on the left wingtip, a green light on the right wingtip, and a white light on the tail. The theory was that, with this system, a pilot could judge another plane's relationship to his own by observing the color of the lights and the pattern they formed. And it worked very well.

But the whole idea was ruined with the adoption of blinking lights and the addition of a red tail light and two white fuselage lights. The reasoning, of course, was that blinking lights attract one's attention more readily than steady lights, which is certainly true, as any manufacturer of Time's Square signs knows. However, there is one fallacy. As an attention-getter the method works,

but it is just as important that it should also give a *clear picture* to the viewer in the quickest time possible. Present methods of aircraft lighting not only fail to do this but, in many circumstances, sible. Present methods of airthe following report as an example. This actually happened:

Recently as one . . . aircraft approached Chicago, at night, it met an outbound DC-3 proceeding toward Grand Rapids. The pilot of the DC-3 turned on his landing lights when he observed (the first) . . . aircraft. (The first) . . . aircraft acknowledged this recognition by turning on wing ice lights and the (retracted) landing lights.

A very near miss occurred.

In the follow up investigation, the pilot of the DC-3 and the Chief Pilot of the airline involved, who happened to be riding along, stated emphatically that when (the other) . . . aircraft turned on the wing and landing lights they were *completely* confused as to the direction of flight of . . . (the) ship which resulted in their heading unknowingly directly toward . . . (the other) ship. The Captain of . . . (the other) ship stated, "Had the - - - - not been a highly maneuverable ship, I don't believe I would have been able to have missed it. It was a very close call.

This illustrates dramatically that lighting an airplane like a Christmas tree does not necessarily contribute toward avoidance of mid-air collisions. The reason is this:

The human eye has certain inborn characteristics that might be considered weaknesses. It is subject to all sorts of optical illusions, as countless diagrams, pictures, and puzzles put out for our amusement demonstrate. It is more difficult for the eye to resolve a group of flashing lights into a definite form or pattern, and to determine the object's movement, than a group of steady lights. Perception in the eye is not instantaneous but requires a certain interval in which to record impressions and then allow the brain to interpret these impressions. If these impressions continually change very rapidly, the tendency is for the image to be confused, and although there will be no doubt in the mind that the object exists, there will be considerable difficulty in determining just what sort of object it is, how far away it is, and where it is headed.

Let's take a look at how this applies to our modern airliner. As mentioned previously, it has a red light on the left wingtip, a green light on the right wingtip, a white light on the tail, a red light on the tail, a white light on the top of the fuselage, and a white light on the bottom of the fuselage—all of which flash off and on alternately in what is a most impressive though confusing spectacle. In addition to these lights there are two landing lights and, on some planes, two wing ice-lights, a red and white nose light, or a rotating beacon! The result—find any pilot that can tell at a glance, the second he sees it, just where the other plane is headed and how far away it is. Just as one's eyes begin to focus on one set of lights, they go off and an entirely new set flashes on—new colors and new positions—then off *they* go and the others come on. The plane looks as though it is jumping forward and backward, or up and down, and only through patient observing can one finally conclude just what the true movement is. But how much time is there for patient observing with closing speeds of 600 m.p.h. and above! Add to this the confusion resulting from turning on wing ice-lights that may appear to be landing lights, or retracted landing lights that may be taken for extended lights, or a rotating beacon that flashes so brightly that all other lights are obscured.

By not taking cognizance of the peculiarities of human vision, we are making it harder for ourselves with each lighting "improvement" when we should be making it easier. The trend has been toward complication, when the answer is *simplicity*. When he sees another object at night, the pilot wants the "complete picture" at first glance, and he can only get this through a simple pattern of *steady* lights, bright enough to be seen from an adequate distance in haze or smoke conditions, and *standard* for all aircraft—private, military, and commercial.

We have discussed the need in fulfilling two primary factors to improve our aircraft lighting, (1) increased intensity; (2) elimination of confusion. In my opinion, the following recommendations would fill this bill:

—Replace the red and green wing-tip lights and the white tail light with bulbs of at least three times the *effective* intensity of present lights.

—Remove flash mechanism.

—Remove red tail lights and white fuselage lights.

—Add a rotating amber beacon on top of the fuselage or vertical stabilizer, with an intensity somewhat lower than the wing and tail running lights. (This would provide a necessary "eye catcher" without causing the regular position lights to be obscured by a brighter flashing light as they are now. Thus, the standard pattern of lights would be clearly visible.

—Add position light dimming switch that, when fipped to "dim" position, cuts off rotating beacon completely and lowers wing and tail position lights to approximately the same intensity as they are now. (This switch would normally be in the "bright" position, but during actual instrument conditions it could be switched to "dim" so as to eliminate the bright reflecting glare from surrounding clouds which is distracting to the pilot.)

By adopting these changes, we would be satisfying all of the necessary factors listed previously. We would be making use of the original idea for position lights; i.e. identification of relative position be steady color patterns, but with brighter intensity needed for modern speeds. In addition, the rotating amber beacon on top of the fuselage or vertical stabilizer would serve as an attention-getter without blotting out the regular position lights by being brighter than they. Yet, when operating on instruments, the pilot could flip a "dimmer" switch simultaneously cutting off the rotating beacon and eliminating the glare of reflection from bright position lights.

I believe that the foregoing suggestions would aid greatly in modernizing airplane lighting and contribute toward additional safety in the continually increasing traffic of high-speed aircraft at night.

Jet Transport

(*Cont. from Page 4*)

have been an extreme handicap if the instance had been a real emergency.

We can only speculate on the effects in case of a jet descension from 10,000 feet under similar conditions.

A light should be installed for detecting and observing ice accretion on the leading edges of the wings. Such light could also be used to check engine nacelles for excessive traces of oil.

Structure. Information from wind tunnel studies should be given consideration when locating and fastening inspection and service doors. There is record of an unscheduled landing due to the severe shaking of a four-engined plane caused by a relatively small inspection door coming open in flight.

Hail effect and general service abuse cannot, perhaps, be entirely avoided, but rugged leading edge design can reduce dents. Considering the speed of a jet transport, every effort to make leading edge replacement relatively easy should be made to maintain "like new" aircraft performance.

In the event of a landing gear failure, the power plant should be designed to break off with a minimum damage to fuel lines, tanks, and the prime surface.

Sufficient space should be provided in the nose to accommodate future devices such as collision warning apparatus, navigational aids, radar equipment, etc. Since it is evident that these devices will be incorporated into airline aircraft, the plane should be designed to support the load of the equipment.

A means for checking highly stressed portions of the airplane's prime structure should be provided. Knowledge of the fatigue of alloys is still in the research stage. It should be possible to visibly check portions of the structure which receive the most stress.

Adequate inspection means for checking the airplane's working parts is needed. A large transport has been demolished due to crossed or reversed lines. Another transport was lost due to an electrical lead carrying high amperage coming loose and causing arcing. Adequate inspection could have prevented these and similar accidents.

Cockpit. A more reliable seat locking device is needed. Pilots still occasionally start a take-off and have the forward thrust cause their seat to move back out of reach of the controls due to the seat lock not being properly engaged.

A shoulder harness should be provided for pilots. Accident records reveal that many head injuries are encountered in a survivable crash.

The noise level in the cockpit should be reduced. Heating and ventilating system cause considerable noise in the cockpit. Such noises also make radio communications difficult to understand.

Instruments. Flow meters are considered a valuable instrument to aid in determining power plant malfunctioning. Their inclusion on turbine powered aircraft should be mandatory, not only to determine a poor combustion rate, but to aid the flight crew in checking engine performance.

The installation of accelerometers will provide the flight crew and engineers with knowledge of the structural loads encountered in flight. This instrument provides a sure means of determining whether or not an immediate and thorough inspection of the plane's structure is necessary due to flight loads encountered during turbulence or hard landings.

Miscellaneous. High pressure inflammable fluid lines should be shrouded at connecting fittings so that a leak will not spray an ignition source. These lines should be routed as far as possible from ignition sources.

Careful consideration should be given to the establishment of a proper balance between operating systems, i.e., the aircraft should not be almost exclusively an "electric airplane" or a "hydraulic airplane." Maximum safety can be obtained by a sound division of responsibility among the electric, hydraulic and vacuum systems.

Daylight cockpit radar presentation should be developed and installed, with first priority given to weather and turbulence scanning and secondary importance going to terrain clearance warning.

All possible support and cooperation should be given to the proposed testing program of the Prototype Aircraft Advisory Committee so that the operating and design problems of turbine powered aircraft may be more studiously investigated, and solved prior to the commercial operation of turbine powered transport aircraft.

Fire hazards must be reduced . . .

Too Good To Be True?

But it is true!

Our exclusive President's Protective Investment Plan offers a highly flexible method of providing extra protection for your family while you build up income for retirement. If death occurs during the 20 depositing years, your family's protection hasn't cost a cent. All your deposits are returned to them plus the full principal amount of the contract. Special emergency and opportunity funds provide further flexibility.

The Franklin Life has pioneered in the development of such exclusive and modern insured savings contracts, just as it is the first company to provide unlimited and unrestricted life insurance coverage to airline flight personnel on a standard basis.

A further saving of 6% on the monthly premium is made available to you through the payroll deduction plan provided for Franklin policyowners by several of the scheduled airlines. Let us give you a full explanation—without obligation, of course.

AIRLINE UNDERWRITERS, INC.

158 Valencia Ave.
Coral Gables, Florida

The Franklin Life Insurance Company

Springfield, Illinois

A Billion Dollar Institution

Tear off and mail

AIRLINE UNDERWRITERS, INC. 158 Valencia Avenue, Coral Gables, Fla.

Please send me further information regarding your convenient and low cost insured savings and protection plans for Airline flight personnel.

Name..... Date of Birth.....

Address..... Airline.....

City..... Zone..... State.....